Stoneleigh Traffic Management Study

Study Report

Warwickshire County Council

29 May 2018

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Executive summary

Introduction

Warwickshire County Council (WCC) commissioned Atkins to undertake a traffic management study in Stoneleigh, Warwickshire, to identify a short-list of options to reduce traffic in the village to be taken forward for further development. The study was commissioned in the context of significant changes planned for the wider area around Stoneleigh, including significant housing and employment growth, which is expected to result in increasing traffic flows and congestion in the area.

Objectives

To guide the study and provide a consistent way in which to assess different interventions in the Stoneleigh area, a series of objectives were set, as follows:

- **Objective 1:** To reduce traffic on Birmingham Road through the centre of Stoneleigh Village;
- **Objective 2:** To reduce traffic on Coventry Road in Stoneleigh Village and the narrow bridge over the River Sowe;
- **Objective 3:** To maintain good access to Stoneleigh Park, Warwick University and other key trip attractors in the area and maintain resilience of the local road network when issues occur on the wider network;
- **Objective 4:** To reduce the environmental impacts of traffic congestion within and close to the village of Stoneleigh;
- **Objective 5:** To make best use of the HS2 Ltd infrastructure being provided in Stoneleigh to ensure that potential solutions are affordable; and
- **Objective 6:** To ensure that potential solutions are deliverable within a reasonable timescale.

Long-list of Options

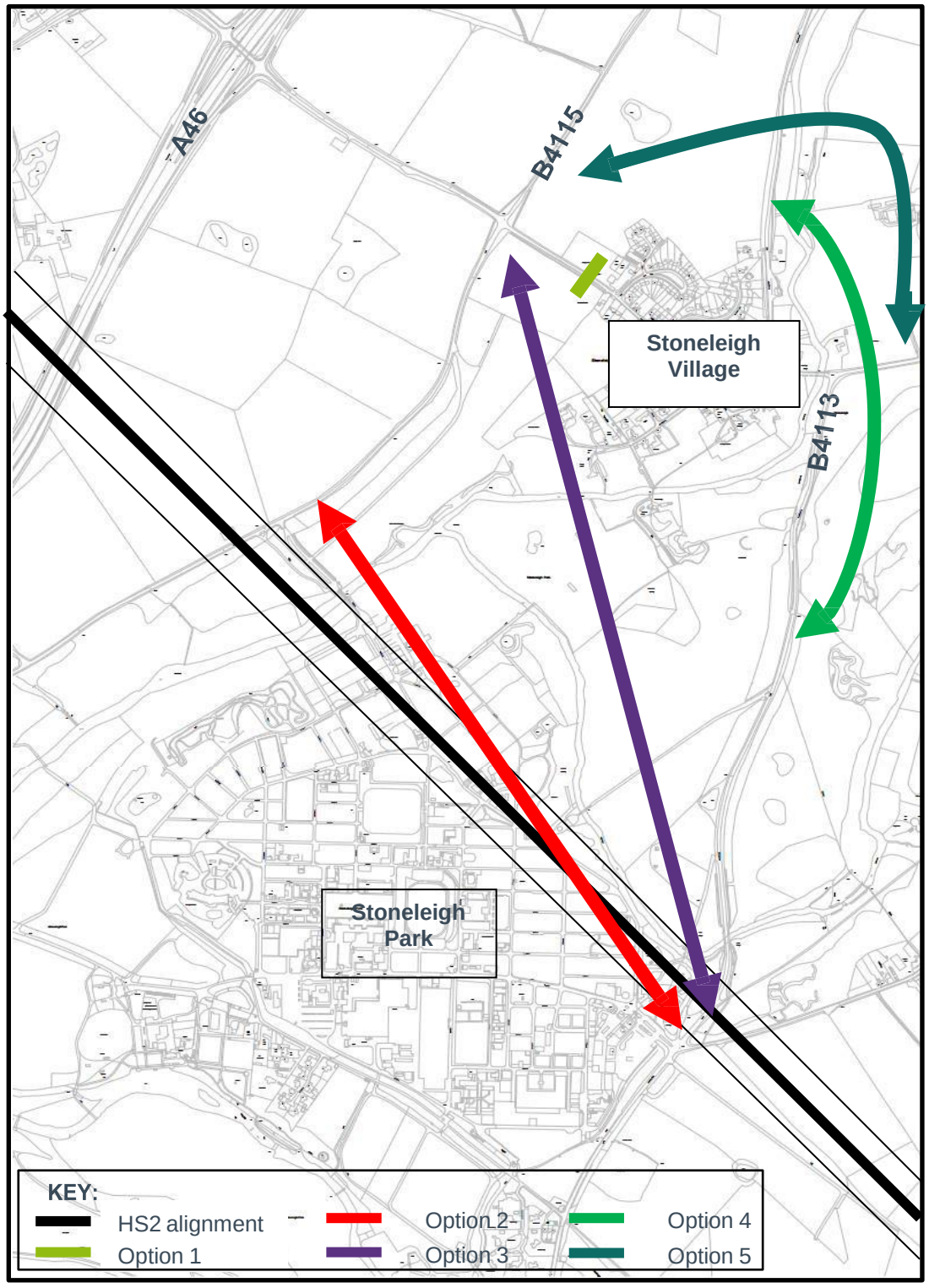
To gain an understanding of the traffic conditions in Stoneleigh village, a traffic model was developed which allows an assessment of future year conditions on the highway network given differing development scenarios. It is therefore a useful tool when determining the appropriateness of different changes in the future.

Investigation of the 2029 scenario, which includes local plan growth for the area, but excludes any specific transport interventions in the Stoneleigh area (beyond those already committed), shows that traffic flows on routes through the village are forecast to increase by as much as 11% by 2029, giving rise to additional congestion and associated negative environmental impacts.

On the basis of clear evidence of increasing traffic flows in the village and building on the identified objectives of the study, Atkins has produced a long-list of potential interventions ranging from those which are modest in size and hence may be quickly deliverable, through to more major interventions that are likely to form medium or longer-term options:

- **Option 0:** Do nothing;
- **Option 1:** A closure of Birmingham Road, east of the junction with the B4115;
- **Option 2:** A western bypass through Stoneleigh Park to the B4115;
- **Option 3:** A western bypass using an alignment between Stoneleigh Park and Stoneleigh village;
- **Option 4:** An eastern bypass using an alignment between Stoneleigh Road and Coventry Road; and
- **Option 5:** A northern bypass using an alignment between Coventry Road and Birmingham Road.

The broad locations of the options above are shown in the plan overleaf.



Short-list of Options

A process was undertaken of comparing the six options above to the study objectives, using available evidence to provide a robust assessment, including information from the aforementioned traffic modelling. Following this process, a sift was undertaken, taking the list of six options down to the following list of three options for more detailed investigation:

- **Option 1:** A closure on Birmingham Road, east of the junction with the B4115;
- **Option 2:** A western bypass through Stoneleigh Park to the B4115; and
- **Option 3:** A western bypass using an alignment between Stoneleigh Park and Stoneleigh Village.

Of the options not short-listed, Option 0 was deemed not appropriate for further investigation as it offers no scope to overcome the identified increases in traffic. Options 4 and 5 would offer scope to provide congestion relief in the village but were ruled out on the grounds of significant deliverability concerns given the alignments requirement and associated gradients / land take requirements.

Recommendations and Next Steps

Following a more detailed assessment of the three short-listed options, it was recommended by Atkins that all three options were taken forward for further development by WCC, as all offer considerable scope to meet the study objectives and provide congestion relief to the village of Stoneleigh. An overview of the key findings associated with the three options is provided below.

Option	Key Components	Cost	Fit with Study Objectives
1. A closure to Birmingham Road, east of the junction with the B4115	Closure of Birmingham Road at junction with B4115 and conversion of the B4115 / B4113 Junction to a signalised junction, to accommodate increased usage as a result of the closure of Birmingham Road.	£130k	• This option would reduce traffic on Birmingham Road, Coventry Road, and reduce pressure on the bridge over the River Sowe. • It would reduce the environmental impacts of congestion in Stoneleigh village and is deliverable within short timescales. • It does however have clear implications for residents in the area who may now have a longer journey as a result of not being able to use Birmingham Road to access the A46.
2. A western bypass through Stoneleigh Park to the B4115	New bypass through Stoneleigh Park, with a new roundabout at the junction of the bypass / B4115 and a new roundabout to replace the B4115 / Birmingham Road junction. In addition, Birmingham Road is blocked on the west side of the village as per Option 1.	£41m - note that HS2 Ltd would fund the majority of this cost as a result of works in the area, so little contribution would be required by WCC.	• This option would reduce traffic on Birmingham Road, Coventry Road, and reduce pressure on the bridge over the River Sowe. • It would reduce the environmental impacts of congestion in Stoneleigh village. • It would improve access to Stoneleigh Park by providing a direct route. • It would make best use of the HS2 infrastructure being provided in the area, thereby reducing costs. • It would need to be delivered by 2026 at the latest.
3. A western bypass using an alignment between Stoneleigh Park and Stoneleigh Village	New bypass between Stoneleigh Park and the village of Stoneleigh. The works include building the bypass and a new roundabout to replace the B4115 / Birmingham Road junction. In addition, Birmingham Road is blocked on the west side of the village as per Option 1.	£31m - note that HS2 Ltd may fund a small part of this cost as a result of works in the area. The remainder of the cost would be dependent on a strong business case and the availability of funding from WCC or others.	• It would reduce traffic on Birmingham Road, Coventry Road, and reduce pressure on the bridge over the River Sowe. • It would reduce the environmental impacts of congestion in Stoneleigh village. • It would improve access to Stoneleigh Park by providing a direct route. • It could be delivered by 2026 at the latest.

Further work is now required by WCC to develop the feasibility assessment for the three short-listed options:

- **Option 1:** Work is required to determine the optimum location / layout arrangement associated with blocking this route, through consultation with the Parish Council, other key stakeholders and the public. This work should include consideration of likely phasing, given that it does not rely upon any HS2 Ltd works in the area and hence could be considered for implementation as a 'quick win' in the near future;

- **Option 2:** The option uses a considerable amount of the infrastructure proposed by HS2 Ltd to create a new bypass, offering the opportunity to reduce flows of traffic through the village of Stoneleigh. This could be introduced in conjunction with the closure outlined in Option 1. Further work is required to confirm HS2 Ltd's intentions regarding infrastructure in Stoneleigh Park, noting that construction work is forecast to begin in the area in 2019. Liaison is also required to ensure that the highway route being provided by HS2 Ltd through Stoneleigh Park is of a suitable standard that could be adopted by the local authority; and
- **Option 3:** As per Option 2, this option also offers the opportunity to significantly reduce traffic flows in the village of Stoneleigh, but it does not use HS2 Ltd infrastructure to the same extent as that proposed in Option 2. Further work is required to understand the level of value for money taking account of the modelled benefits and estimated scheme costs. This will allow for a direct comparison to be made between Options 2 and 3.

1. Introduction

1.1. Introduction

Warwickshire County Council (WCC) commissioned Atkins to undertake a traffic management study in Stoneleigh, Warwickshire. The aim of the study is to identify a short-list of options for reducing traffic congestion in the village of Stoneleigh that can be taken forward for further development. This is in the context of significant changes planned for the area which are expected to lead to increasing traffic flows and congestion.

1.2. Background

Stoneleigh is a small village in rural Warwickshire, located five miles south of Coventry and five miles north of Leamington Spa. The village is located at the heart of the West Midlands' highway network, close to the A45, A46, M40, and M6 which are of strategic importance to the region. It is also located close to a number of key development sites such as Stoneleigh Park and Warwick University. This has ensured that this area of Warwickshire is an attractive place to live, work and invest in.

However, the proximity of Stoneleigh to these and other important sites has resulted in a large increase in through-traffic in the village in recent years. The single-lane roads through the centre of the village are now heavily congested at peak times, causing safety and environmental concerns for residents. In addition, congestion is reducing the attractiveness of Stoneleigh as a place to live. Congestion issues in the village are expected to worsen during the coming years due to planned growth at Stoneleigh Park, Warwick University, Coventry, Kenilworth, and Warwick / Leamington Spa. Therefore, Stoneleigh Parish Council has requested that WCC looks at options to reduce traffic in the village.

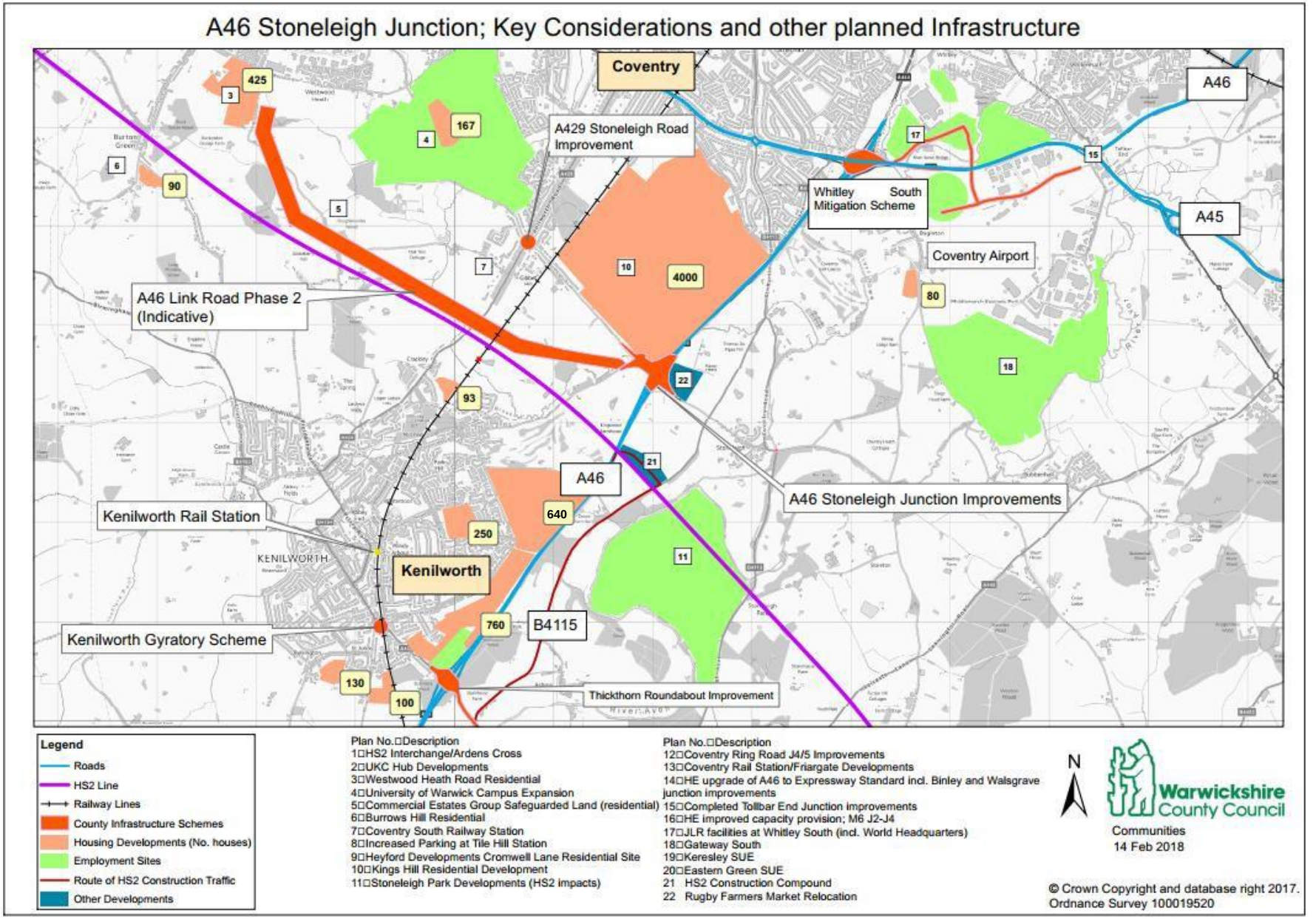
In addition to the developments outlined above, the route of HS2 will cross Stoneleigh; splitting Stoneleigh Park at the north. However, HS2 Ltd is providing infrastructure mitigation to ensure that access to both sides of the park is maintained both during and post-HS2 construction. HS2 Ltd will also have a compound close to Stoneleigh for the duration of the construction work.

The remainder of this report outlines Atkins' assessment of the options available to WCC to overcome the issues identified in and close to the village.

1.3. Planned Development

A significant amount of development is planned in the Stoneleigh area over the coming years. Figure 1 outlines the location and scale of these developments. The figure shows that 4,000 new houses are planned at Kings Hill which is located approximately 2km north-west of Stoneleigh. In addition, over 2,000 new houses are planned along the A46 around Kenilworth. A number of new or expanded employment sites are also planned which will increase the number of trips in the area. This includes employment growth at Stoneleigh Park, Gateway South, Jaguar Land Rover (Whitley), and the University of Warwick.

Figure 1. Expected Changes in the Stoneleigh Area



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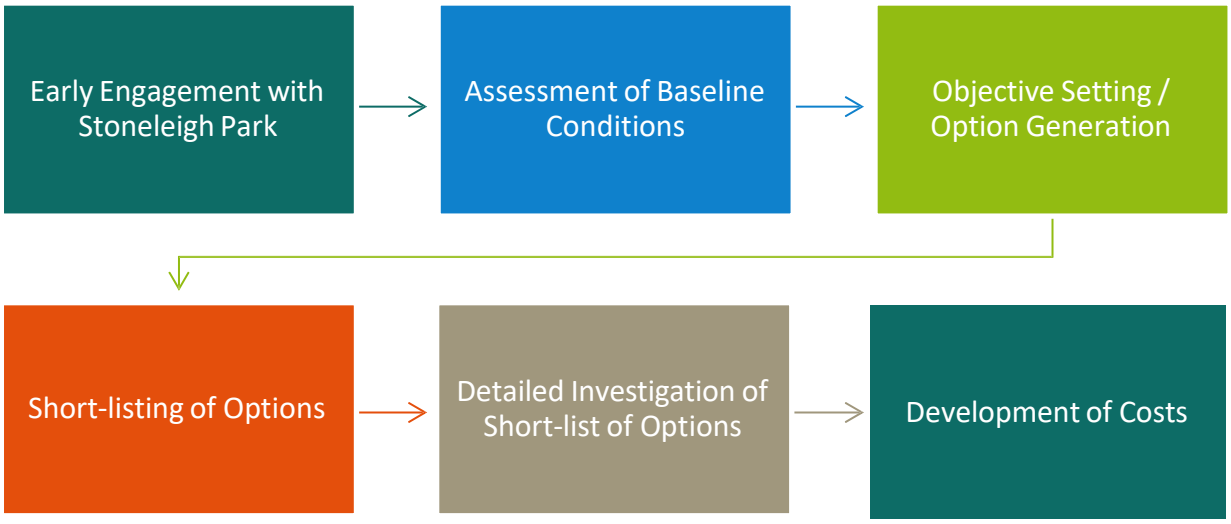
1.4. Study Structure

The Stoneleigh Traffic Management Study was undertaken in six stages, as outlined in the following flow chart.



This study report follows the structure outlined above and makes a recommendation for a short-list of options to be taken further for further development. The remainder of the report is structured as follows:

- **Chapter 2: Early Engagement with Stoneleigh Park** – outlines the key points arising from early engagement with Stoneleigh Park;
- **Chapter 3: Assessment of Baseline Conditions** – summarises the current traffic conditions in the Stoneleigh area and highlights existing and future congestion hotspots;
- **Chapter 4: Objective Setting / Option Generation** – identifies the objectives for this study and details the high-level optioneering process to identify potential traffic management improvements;
- **Chapter 5: Shortlisting of Options** – provides a recommendation on the short-list of options;
- **Chapter 6: Detailed Investigation of Short-list of Options** – summarises the results from the environmental assessment and traffic modelling to understand the viability of each option;
- **Chapter 7: Costs** – provides high-level costs for the short-list of options; and
- **Chapter 8: Summary of Findings** – includes a recommendation for the options that should be taken forward for further investigation.

2. Early Engagement with Stoneleigh Park

2.1. Introduction

Prior to beginning the optioneering process, Atkins met with representatives of Stoneleigh Park to discuss existing constraints and future opportunities, given the major changes that are expected to occur in and around the park as a result of HS2 Ltd's construction work in the coming years. Hence any works undertaken in the vicinity of Stoneleigh Park will have a bearing on the feasibility of highway options in and around the village of Stoneleigh. This chapter outlines the key points arising from this discussion.

2.2. Key Points

Table 1 outlines the key points arising from Atkins' consultation with Stoneleigh Park. This meeting was held on 14th August 2017 at Stoneleigh Park.

Table 1. Stoneleigh Park - Stakeholder Session Summary

Meeting Notes
• There are currently two entrances to the park, with the main entrance on the B4113 and a second entrance from the B4115 which is only used for emergencies or large events. • A masterplan for the site was developed in 2012 which outlined new, improved highway access points to Stoneleigh Park including a roundabout at the main entrance and a new crossing over the River Avon to the West. These highway improvements were however not delivered as investors were concerned about subsequent HS2 Ltd plans for the park. • There has been agreement between Stoneleigh Park and HS2 Ltd that a smaller amount of land would be taken from Stoneleigh Park than originally thought. • HS2 Ltd is expected to fund a new roundabout at the entrance to the park from the B4113 and a new distributor road within the park (construction will start in 2019 and take between 18 months and two years to complete). • HS2 Ltd is also expected to fund two bridges within Stoneleigh Park over the railway to maintain highway access to the site. In addition, a further bridge will be funded on the B4113 Stoneleigh Road to the east of the site (construction will again start in 2019 and take between 18 months and two years to complete). • Stoneleigh Park is aware of the issues within Stoneleigh Village and tries to direct traffic to / from the site away from the village and the scheduled monument bridge. Stoneleigh Park also raised concerns regarding the priority for vehicles on the B4113 in the village, leading to safety concerns. • Stoneleigh Park has undertaken surveys in the past which have concluded that a significant proportion of traffic passing through Stoneleigh Village is travelling to / from Warwick University and not Stoneleigh Park. • Stoneleigh Park plans to move the livestock market to another site by the A46. The livestock market operates on average 1.5 times per week. • HS2 Ltd plans to route 400 HGVs along the B4115 each day to / from a construction compound. Stoneleigh Park has concerns around this arrangement and would favour an alternative whereby all construction traffic arrives and departs via the A46 junction and Stoneleigh Road. • As HS2 Ltd is funding a number of highway infrastructure improvements, Stoneleigh Park believes it might be feasible for a new bypass to be created that could reduce the number of vehicles passing through the village of Stoneleigh. The land required to construct this bypass is privately owned so would need to be acquired. HS2 Ltd contractors are under a 'Design and Build' contract so discussions would need to be held with them to discuss designs.

3. Assessment of Baseline Conditions

3.1. Introduction

To gain an understanding of the traffic conditions in Stoneleigh village, Vectos Microsim (VM), on behalf of WCC, has run a baseline (2016) and future year (2029) version of the Kenilworth and Stoneleigh Wider Area Paramics Microsimulation Model (KSWA). This is a traffic model that allows an assessment of future year conditions on the highway network given differing development scenarios. It is therefore a useful tool when determining the appropriateness of different changes in the future.

This chapter summaries the existing and forecast traffic conditions in the Stoneleigh area and highlights congestion hotspots in each scenario.

3.2. Kenilworth and Stoneleigh Wider Area Paramics Microsimulation Model

Two different model scenarios have been tested by VM in order to provide Atkins with details of the existing traffic and forecast levels of traffic in the future. The two scenarios are as follows:

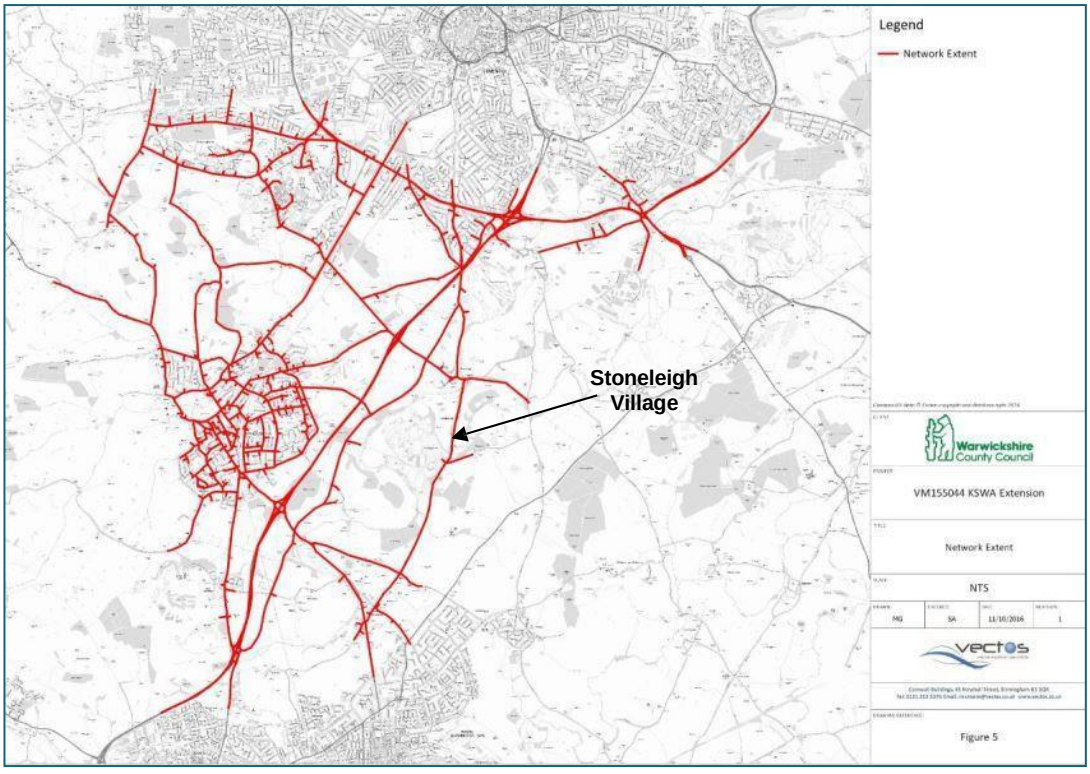
- Baseline (2016): This version of the model represents traffic as at 2016, and provides a base from which future comparisons can be made; and

- Local Plan Model (2029): This version of the model represents traffic as at 2029, taking into account the transport impacts of the allocated development sites put forward as part of the Warwick District Council Local Plan.

The models are over two-time periods; namely the AM peak (between 07:00 and 10:00) and the PM peak (between 16:00 and 19:00).

The geographical coverage of the model is outlined in Figure 2. The figure shows that the model provides good coverage of the Stoneleigh area and the A46 corridor between the north of Warwick and the south of Coventry.

Figure 2. Model Coverage

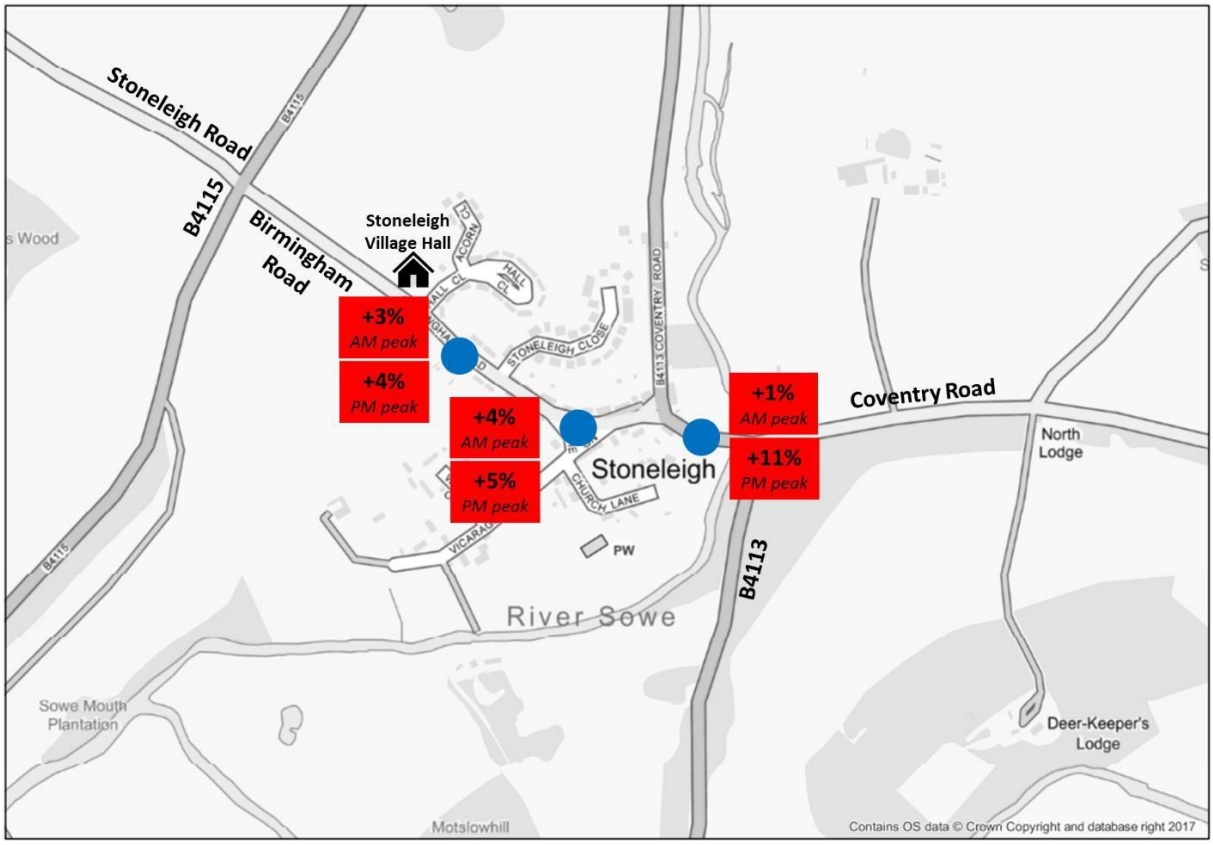


3.2.1. Link Flows

To provide an indication of the changes in traffic that are expected in the village in the future, as a result of the developments outlined earlier, link flow information has been extracted for three locations, as shown in Figure 3. The figure examines the percentage change between the base and 2029 Local Plan scenarios, and hence a positive percentage means that an increase in traffic flows is forecast.

The figure shows that flows through the village are expected to increase between the base and 2029 Local Plan scenario. On Coventry Road, vehicle flows are expected to increase by 11% during the PM period between the base and 2029 Local Plan scenarios. The percentage changes forecast on the other routes and time periods are lower, at between 1% and 5%.

Figure 3. Link Flow Comparison: Baseline to 2029 Local Plan Scenario



4. Objective Setting / Option Generation

4.1. Introduction

This chapter introduces the objectives for the Stoneleigh Traffic Management Study and details the long-list of options for traffic management improvements. A recommendation on the short-list of options for more detailed investigation is also provided.

4.2. Objectives

To guide the Stoneleigh Traffic Management Study, a series of objectives were set based on the review of baseline conditions and the early stakeholder engagement. The objectives, and the rationale behind them, are outlined in Table 2.

Table 2. Study Objectives

Name	Objective	Rationale for Objective
Objective 1	To reduce traffic on Birmingham Road through the centre of Stoneleigh Village.	The amount of through-traffic passing through Stoneleigh Village in the morning and evening peak is causing congestion. The earlier modelling interrogation showed that flows on Birmingham Road and Coventry Road through the village are forecast to increase in the future, with increases on Birmingham Road of between 3% and 5%.
Objective 2	To reduce traffic on Coventry Road in Stoneleigh Village and the narrow bridge over the River Sowe.	Through-traffic from the east is using Coventry Road to access Birmingham Road through the village of Stoneleigh. This is causing traffic issues within the village, but also issues for the bridge crossing the River Sowe which is scheduled under the Ancient Monuments and Archaeological Areas Act). This bridge is considered a pinch point to free-flowing traffic.
Objective 3	To maintain good access to Stoneleigh Park, Warwick University and other key trip attractors in the area and maintain resilience of the local road network when issues occur on the wider network.	There are a number of key employment and education sites in Warwickshire which are essential to the regional economy. It is essential that access to these sites is maintained, or improved if possible, during business-as-usual operation and when there are challenges to normal operation of the network.
Objective 4	To reduce the environmental impacts of traffic congestion within and close to the village of Stoneleigh.	Traffic congestion in Stoneleigh village has resulted in poor air quality in the area and as such this objective seeks to minimise any harmful environmental impacts associated with high flows of traffic.
Objective 5	To make best use of the HS2 Ltd infrastructure being provided in Stoneleigh to ensure that potential solutions are affordable.	HS2 Ltd is funding transport infrastructure in the Stoneleigh area to support, or in some instances negate, the impacts of delivering HS2. It is important that WCC maximises the opportunity associated with this infrastructure.
Objective 6	To ensure that potential solutions are deliverable within a reasonable timescale.	The congestion, environmental, and access issues in and around the village of Stoneleigh are expected to get worse over the coming years, as shown by the base versus 2029 modelling in the previous chapter. It is therefore imperative that solutions can be delivered in a reasonable timescale to provide relief for residents in the village.

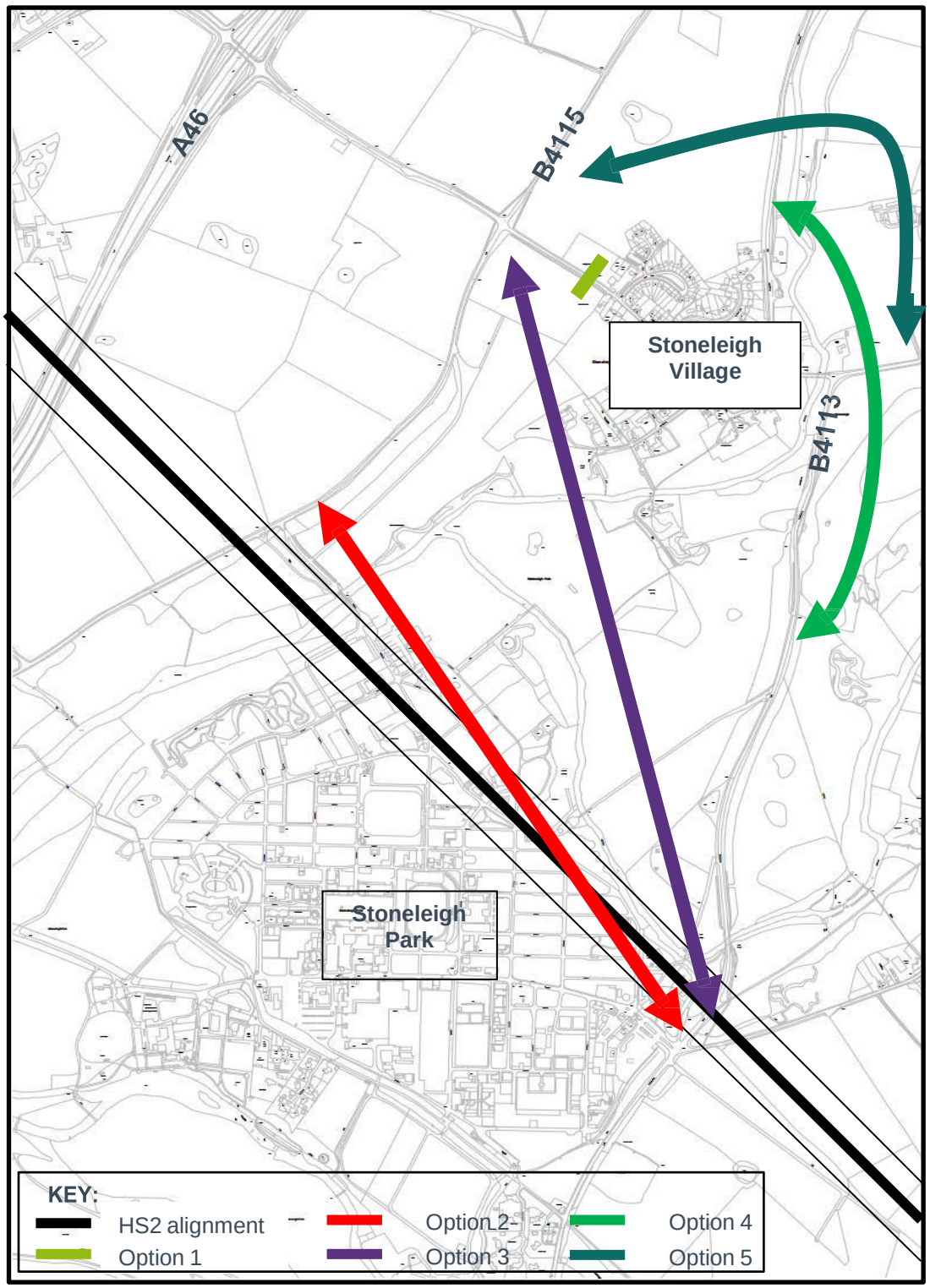
The study objectives are then used to assess the long-list of options to ensure that they fit with the aims of the study.

4.3. Long-list of Options

Using the information provided during the stakeholder session with Stoneleigh Park and the baseline conditions from the KSWA model, six options were developed to address congestion in the village of Stoneleigh. The options are detailed in the following bullets and illustrated (at a high-level) in Figure 4. Note that the alignments are broad at this stage rather than showing specific alignments, which is appropriate given the stage of feasibility. The options are as follows:

- **Option 0:** Do nothing;
- **Option 1:** A closure of Birmingham Road, east of the junction with the B4115;
- **Option 2:** A western bypass through Stoneleigh Park to the B4115;
- **Option 3:** A western bypass using an alignment between Stoneleigh Park and Stoneleigh village;
- **Option 4:** An eastern bypass using an alignment between Stoneleigh Road and Coventry Road; and
- **Option 5:** A northern bypass using an alignment between Coventry Road and Birmingham Road.

Figure 4. Long-List of Options



Details for each option are provided in Table 3, including any supporting evidence from the base versus 2029 modelling and associated advantages and disadvantages. The table also makes reference to any wider network changes that may be required.

Note that the modelling evidence presented in Table 3 is from the base (2016) and 2029 model runs outlined earlier in the report. Hence at this stage, no specific modelling of each option has been undertaken.

The key to the scoring of objectives is outlined below.

Key to Objective Scoring
Little or no fit with objective
Some fit with objective
Considerable fit with objective

Table 3. Long-list of Options

Option Number and Name	Context	Timing	Modelling Evidence based on a comparison of the base (2016) and the future year (2029)	Advantages	Disadvantages	Fit Against Study Objectives						Wider Network Changes Required
						Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6	
0) Do nothing	This 'do nothing' option would see no changes being made in the Stoneleigh area, allowing vehicles to continue travelling through the village as currently.	N/A – as no intervention would be introduced.	The earlier modelling showed that conditions are expected to worsen in the area (with increasing link flows in the village) and hence the 'do nothing' option does not provide any mitigation.	• Low cost. • No infrastructure to deliver.	• Does not address traffic congestion in Stoneleigh village. • The forecast traffic growth in and around Stoneleigh would further congest local roads and hence would not address concerns raised by residents.							N/A.
1) A closure to Birmingham Road, east of the junction with the B4115	Concerns about the amount of traffic using Stoneleigh village as a through route, particularly in light of the proposed upgrade at the Stoneleigh Road / A46 Junction. This option would make Birmingham Road a dead-end so would prevent through movements via this route. A turning head would be provided at the junction of Birmingham Road and the B4115.	Could be delivered in the short-term as it is not dependent on, or in conflict with, the proposed HS2 route. Would ideally be timed to coincide with the major improvement of the A46 junction to the west of the village of Stoneleigh.	Up to a 5% increase in traffic is expected on Birmingham Road through Stoneleigh village between 2016 and 2029, as outlined earlier in the report. Up to an 11% increase in traffic is expected on Coventry Road to the east of the village.	• It is a relatively modest intervention that is low cost and quick to deliver. • It would ensure that Stoneleigh village was no longer used as a through-route to access the A46. • There would be improved road safety in the village as there would be less traffic. • There could be a reduction in traffic on the Coventry Road bridge over the River Sowe which is a pinch point.	• Stoneleigh village residents would be required to take a long detour to access the B4115 or A46, via the B4113 then B4115, which could make this measure unpopular. • This option diverts traffic onto other local roads and hence may be unpopular elsewhere.							The B4113 / B4115 junction would need to be considered for capacity / visibility improvements if it is to be used by more vehicles, particularly those using the junction having been re-routed away from Birmingham Road.
2) A western bypass through Stoneleigh Park to the B4115	Concerns about the amount of traffic using Stoneleigh Village as a through route to access Stoneleigh Park. HS2 Ltd is expected to provide highway improvements at Stoneleigh Park which could be linked together to create a western bypass and therefore potentially reduce traffic flows through the village of Stoneleigh.	The highways improvements at Stoneleigh Park are currently in the detailed design stage so WCC would need to meet with the HS2 Ltd contractor quickly to ensure that the infrastructure provided is of a standard that could be used for a bypass. This bypass could not be delivered until the bridge over the HS2 railway line to connect either side of Stoneleigh Park has been delivered.	As above for option 1	• It builds upon infrastructure being provided by HS2 Ltd in the area. • It will provide additional road capacity in the area. • It will provide direct access to Stoneleigh Park from the B4115 and A46. • It will reduce the number of vehicles using Stoneleigh village to access Stoneleigh Park. • There could be a reduction in traffic on the Coventry Road bridge over the River Sowe which is a pinch point.	• It would require agreement with HS2 Ltd and its contractors to ensure that the infrastructure provided is the right standard. There may be difficulties in gaining agreement if the highway is going to be adopted by WCC. • There is a clear need to consider HS2 Ltd's plans in the context of a bypass to ensure the standard of carriageway is appropriate (including lane widths and radii).							The capacity / road layout of the B4115 would have to be considered to ensure that it could accommodate a new bypass. Visibility concerns have been raised at this location. Also need to consider whether the Birmingham Road / B4115 junction can accommodate high flows.
3) A western bypass using an alignment between Stoneleigh Park and Stoneleigh Village	Concerns about the amount of traffic using Stoneleigh village as a through route to access Stoneleigh Park. Questions around whether a route through Stoneleigh Park, utilising the HS2 Ltd funded infrastructure, is the best route for a western bypass. This option would avoid Stoneleigh Park and provide a bypass through farmland, using	The bypass could not be delivered until the bridge over the HS2 railway line on the B4113 has been delivered. This would be in place by 2026 at the latest, but could be significantly earlier.	As above for option 1	• The bypass route would not be constrained by HS2 infrastructure and would therefore take the most direct route to Birmingham Road. However, it would use the new bridge and roundabout on the B4113. • It will provide a direct connection to the B4115 / Stoneleigh Road junction	• None of the infrastructure would be funded by HS2 Ltd (except the roundabout on Stoneleigh Road at the entrance to Stoneleigh Park and the bridge on the B4113). • The land is privately owned and would need to be acquired.							The capacity / road layout of Stoneleigh Road (close to the junction with the A46) would have to be considered to ensure that it could accommodate a new bypass. The B4115 / Stoneleigh Road junction would need to be changed to a four-arm roundabout.

	an alignment between Stoneleigh Park and the village of Stoneleigh.			which will reduce journey times and pressure on the B4115. • It will provide additional road capacity in the area. • It will provide direct access to Stoneleigh Park from the A46. • It will reduce the number of vehicles using Stoneleigh village to access Stoneleigh Park. • There could be a reduction in traffic on the Coventry Road bridge over the River Sowe which is a pinch point. • It could provide an alternative option to the A452, between Leamington Spa and the A46, which currently has resilience issue due to the historic bridge at Chesford.		
4) An eastern bypass using an alignment between Stoneleigh Road and Coventry Road	Concerns about the amount of traffic using Stoneleigh Village as a through route to access Stoneleigh Park. This option would avoid Stoneleigh Park and provide a bypass through Stoneleigh Deer Park Golf Club which directly links Stoneleigh Road and Coventry Road.	This bypass option would require significant land take and permissions so it may take a long time to deliver.	As above for option 1	• The bypass route would not be constrained by HS2 infrastructure. • It would provide a direct connect between the B4115 and Stoneleigh Park which would negate the need for vehicles to travel through Stoneleigh village.	• Potential high cost option. • The land is privately owned and would need to be acquired. • The alignment will pass through land of differing gradients. • Deliverability concerns given gradients and existing environment.		The B4113 / B4115 junction would need to be considered for capacity improvements if it is to be used by more vehicles. A new bridge would need to be provided over the River Sowe.
5) A northern bypass using an alignment between Coventry Road and Birmingham Road.	Concerns about the amount of traffic using Stoneleigh Village as a through route, particularly in light of the proposed upgrade at the Stoneleigh Road / A46 Junction.	This bypass option would require significant land take, new structures, and permissions so it may take a long time to deliver.	As above for option 1	• The bypass route would not be constrained by HS2 infrastructure. • It would provide a direct link between Coventry Road and Stoneleigh Road which would negate the need for vehicles to travel through Stoneleigh village to access the A46. • There could be a reduction in traffic on the Coventry Road bridge over the River Sowe which is a pinch point.	• Potential high cost option. • The land is privately owned and would need to be acquired. • The alignment will pass through land of differing gradients.		The B4115 / Birmingham Road/ Stoneleigh Road junction would need to be considered for capacity improvements if it is to be used by more vehicles. A number of new junctions would be required where the bypass crosses other roads.

5. Short-listing of Options

5.1. Introduction

Using the information outlined in the previous chapter, Atkins has short-listed the options to provide three options for more detailed consideration in this study. The short-listing has been based on the extent to which each option aligns with the objectives outlined earlier.

These short-listed options are:

- **Option 1:** A closure on Birmingham Road, east of the junction with the B4115;
- **Option 2:** A western bypass through Stoneleigh Park to the B4115; and
- **Option 3:** A western bypass using an alignment between Stoneleigh Park and Stoneleigh Village.

The remaining three options were not taken forward for further investigation at this stage for the following reasons:

- Option 0 did nothing to address current congestion in Stoneleigh village and did not seek mitigate the negative impacts of future traffic growth on local roads. Hence it performed poorly against all objectives in the assessment. For this reason, it is not considered a realistic option for the future and it has therefore been dismissed;
- Option 4 was considered difficult to deliver as the bypass alignment would pass through land of differing gradients, requiring considerable private land take with difficult terrain. This option may therefore be high cost and may not be deliverable within a reasonable timescale. In addition, this option does not make best use of the HS2 Ltd infrastructure being provided in Stoneleigh Park to ensure affordability. This option was therefore dismissed; and
- Option 5 was considered difficult to deliver as the bypass alignment would pass through land of differing gradients, requiring considerable private land take with difficult terrain. In addition, this option would require consideration of the capacity of the B4115 / Birmingham Road / Stoneleigh Road junction to ensure that it could accommodate the expected increase in demand. This option may therefore be high cost and may not be deliverable within a reasonable timescale. As per Option 4, this option does not make best use of the HS2 Ltd infrastructure being provided in Stoneleigh Park to ensure affordability. This option was therefore dismissed.

Having short-listed three options (1, 2 and 3), Atkins has given consideration to the specific alignment / nature of these options, with further details now provided.

5.1.1. Option 1

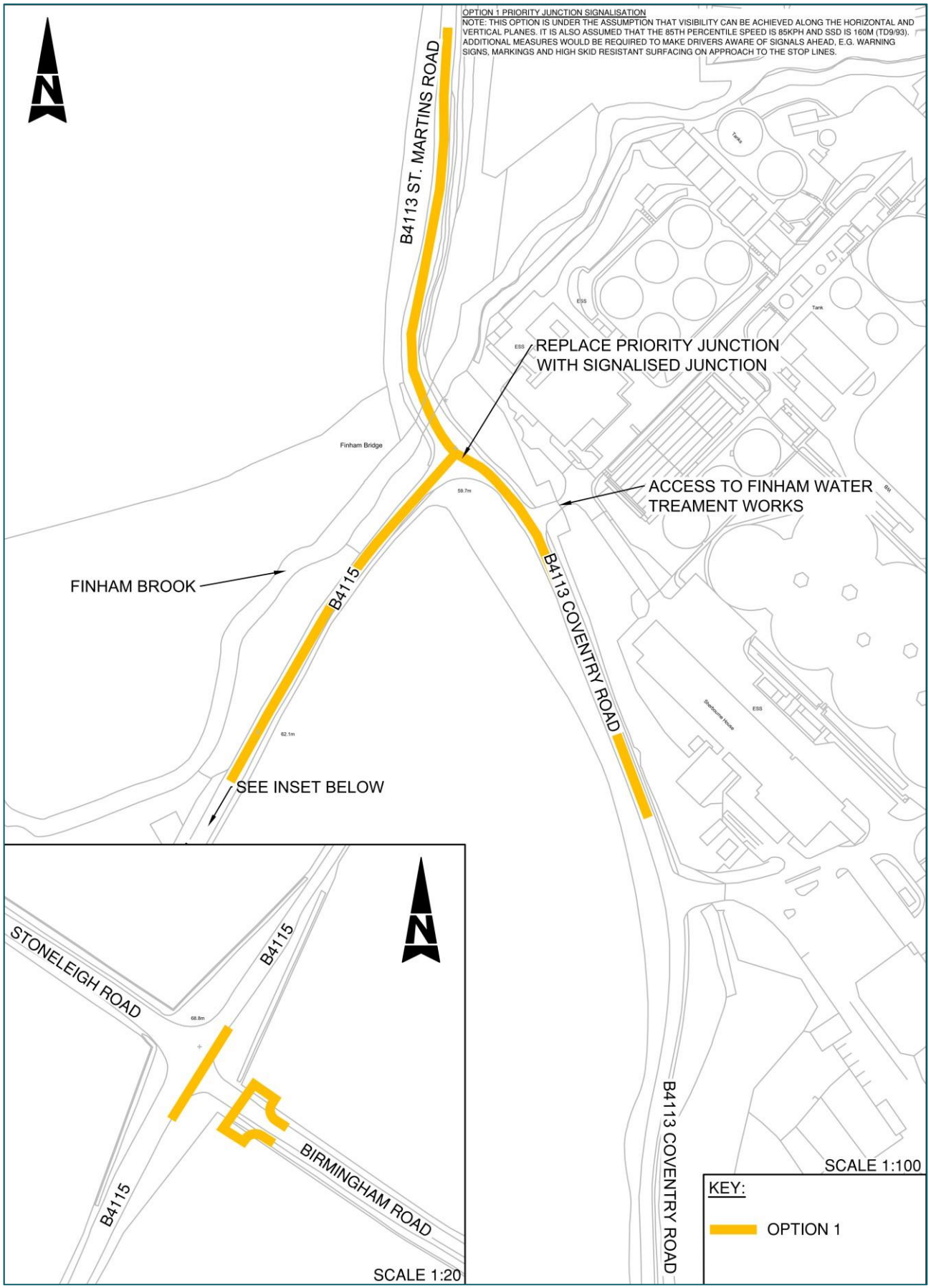
Option 1 proposes to close Birmingham Road to prevent through traffic passing through Stoneleigh village. A combined turning head and an access point to the adjacent field would be provided at the west end of Birmingham Road towards the junction of Stoneleigh Road and the B4115. The access to Birmingham Road would be stopped-up with a new kerb line.

Those wishing to travel between the village and the A46 Stoneleigh Junction would be diverted via the B4115 and B4113 Coventry Road (approximately a 2.4km diversion). This would increase traffic flow at the B4115 / B4113 junction.

During March 2018, WCC completed a separate study into capacity at the B4113 / B4115 junction and the key findings of this assessment were as follows:

- In the Future Year (2029) scenario, the priority junction does not operate within capacity and therefore an alternative junction design is required; and
- Signalisation of the junction provides suitable capacity for Option 1. On this basis, Option 1 assumes that the junction is signalised.

Figure 5. Option 1 Alignment



5.1.2. Option 2

Option 2 proposes to deliver a bypass through Stoneleigh Park to the B4115 to provide an alternative route for traffic travelling between the A46 and Stoneleigh Road.

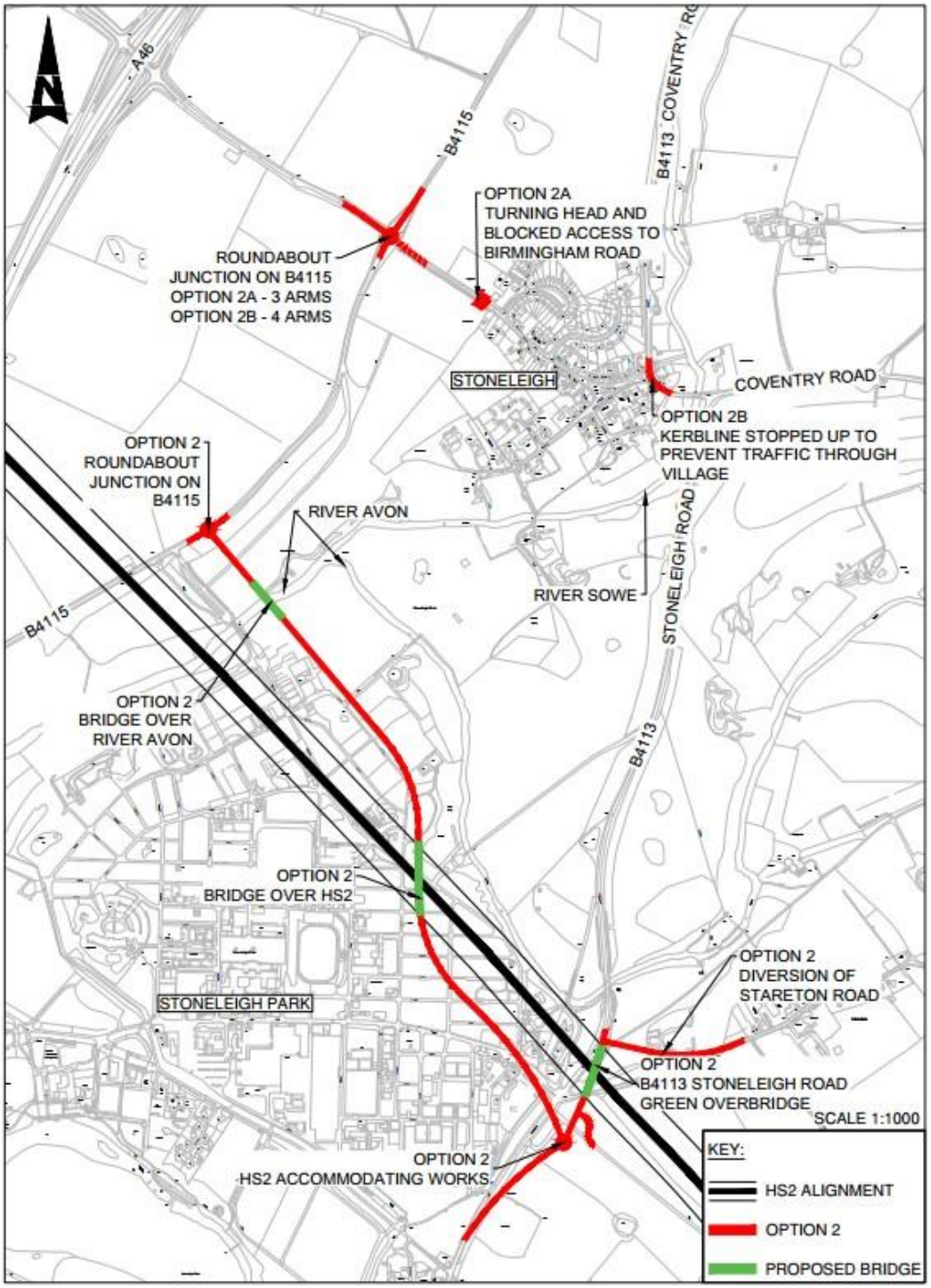
As part of the HS2 Ltd highway improvements, access to Stoneleigh Park is being improved with the provision of a roundabout on Stoneleigh Road which could be linked to create a bypass through Stoneleigh Park to the B4115. The bypass route would start at the new roundabout on the B4113 and run through Stoneleigh Park and across the HS2 railway line. HS2 Ltd is already planning a bridge at this broad location but the indicative plan suggests this bridge would be perpendicular to the railway line, which would present difficulties in terms of providing a bypass. Hence Atkins' sketch shows a bridge alignment that is not perpendicular to the railway line. The bypass would join the B4115 at a roundabout junction and run along Birmingham Road to the junction with the Stoneleigh Road and Birmingham Road. It is proposed that this cross-road junction would be converted to a roundabout junction to aid movements.

In addition, it is proposed that Birmingham Road could still be closed to through-traffic as per Option 1. A road closure could be provided either through a turning head on Birmingham Road adjacent to the Village Hall or through a stopped-up kerb on Coventry Road in the centre of the village.

The bypass would have a 40mph speed limit from the proposed realignment of Stoneleigh Road up to the B4115 where the bypass terminates. A new access to Stoneleigh Park will need to be provided from the bypass.

The alignment of Option 2 is illustrated in Figure 6.

Figure 6. Option 2 Alignment



5.1.3. Option 3

Option 3 proposes to deliver a bypass to the east of Stoneleigh Park to the B4115 / Birmingham Road / Stoneleigh Road junction to provide an alternative route for traffic travelling between the A46 and Stoneleigh Road.

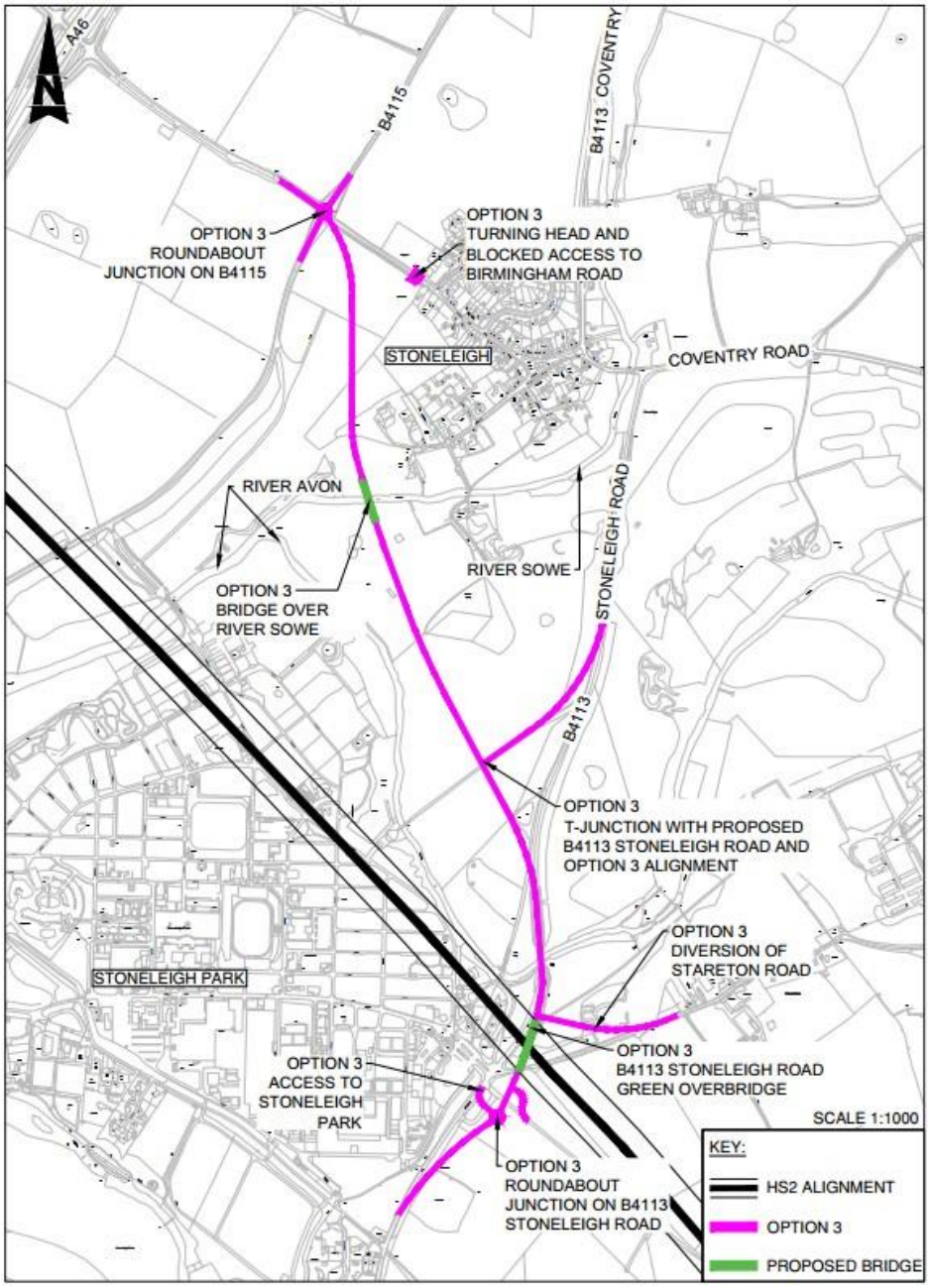
As part of the HS2 highway improvements, access to Stoneleigh Park is being improved with the provision of a roundabout on Stoneleigh Road which could be linked to create a bypass between the B4113 and the B4115 / Birmingham Road / Stoneleigh Road junction. The bypass route would start at the new roundabout and run along Stoneleigh Road before heading north-west through farmland and across the River Sowe. The bypass would join the B4115 / Birmingham Road / Stoneleigh Road at a revised roundabout junction.

In addition, Birmingham Road would be closed to through-traffic as per Options 1 and 2.

The bypass would have a 50mph speed limit from B4113 Stoneleigh Road with appropriate reductions in speed up to the proposed B4115 / Birmingham Road / Stoneleigh Road roundabout junction.

The indicative alignment of Option 3 is illustrated in Figure 7.

Figure 7. Option 3 Alignment



5.2. Consultation on Short-list of Options

Having short-listed the options, Atkins undertook further consultation, as outlined in Table 4.

Table 4. Stakeholder Sessions

Stakeholder	Date and Time	Location	Attendees (Atkins)
Warwick District Council	18/10/2017 @ 09.00	Telephone	Andy Clark Sarah Tuohy
Stoneleigh and Ashow Parish Council	09/11/2017 @ 19.00	Stoneleigh Village Hall	Andy Clark Adrian Taylor

The notes from these sessions are outlined in Tables 5 and 6. The stakeholders were asked to provide their views on the three options that Atkins has short-listed.

Table 5. Warwick District Council - Stakeholder Session Summary

Meeting Notes
Option 1 (Birmingham Road Closure) • In addition to vehicles re-routing towards the B4115 / B4113 junction, re-routing may also occur along the B4115 towards Ashow Village. Therefore, junction improvements may be required at additional junctions to accommodate increased traffic flows. There may be opposition to this option in Ashow village if increased traffic flows on the B4115 result from the closure of Birmingham Road. **Option 2 (Bypass)** • Option 2 is likely to be the more acceptable of the two bypass options from a political perspective. • There is potential for a public transport route to be provided along the new bypass which would increase political acceptability. • Discussions with HS2 Ltd should continue to attempt to change the bridge alignment in Stoneleigh Park from (broadly) perpendicular to diagonal to accommodate a 40mph bypass. • Ideally, the route would continue from the B4115 to a new junction on Stoneleigh Road, close to the A46 junction, once the site is no longer used as an HS2 Ltd compound. **Option 3 (Bypass)** • Concern that this option would not be publicly or politically acceptable as it would cut through the greenbelt between Stoneleigh village and Stoneleigh Park and disrupt flood plains and farmland.

Table 6. Stoneleigh and Ashow Parish Council - Session Summary

Meeting Notes
Option 1 • There is a desire to make the Birmingham Road route less attractive for use, to reduce through-traffic flows in the village. • There is also a desire to address issues with the bridge over the River Sowe. **Option 2** • Consensus that Option 2 is the preferred option (of the three short-listed options) which capitalises on the infrastructure being provided by HS2 Ltd in Stoneleigh Park. **Option 3** • Consensus that Option 3 is not favoured given that it passes relatively close to the western side of the village of Stoneleigh and it would pass through the Stoneleigh Conservation area. **Other Comments** • Another bypass option was suggested for a northerly route, passing the east of the village with a new road to Bubbenhall. It was suggested that this route would be very expensive, difficult to deliver, and would not take advantage of the HS2 legacy works. • There was discussion about traffic on Coventry Road being worse in the AM peak and across the bridge into the village. • Members of the public indicated that there is a lot of traffic travelling to the University of Warwick using the roads through the village of Stoneleigh.

6. Detailed Investigation of Shortlist of Options

6.1. Introduction

Following the optioneering and short-listing process, an environmental assessment was undertaken on the short-list of three options to understand whether the potential interventions would cause any notable environmental issues.

The short-list of options was then modelled in the KSWA model to identify the impact on the transport network. This chapter summaries the results from the environmental assessment and the modelling of the short-list of options to understand whether they are worthy of more detailed consideration after this study has concluded.

6.2. Environment Constraints

6.2.1. Study Area

A constraints map, showing the key environmental constraints in the study area, has been produced and is shown in Figure 8. The map presents the proposed bypass options (Option 2 and Option 3), environmental constraints, and residential and commercial areas within the wider area, including Stoneleigh village, Stoneleigh Park, Ashow village, and the more rural areas surrounding these.

Environmental constraints within the study area broadly include the River Avon, the River Sowe, two registered parks and gardens to the east and west of Stoneleigh Park, areas of fragmented ancient and semi-natural woodland, ancient replanted woodland, scheduled monuments and numerous listed buildings (Grade I; Grade II*; and Grade II). No ecologically designated sites are present within the study area.

Within Stoneleigh village there are 37 listed buildings (one Grade I and 36 Grade II), including Hall Farm and Worth Lodge to the north-east and to the east, respectively. Within Ashow village to the south-west of Stoneleigh Park, 16 listed buildings are present (one Grade I and 15 Grade II). There are no records of listed buildings in Stoneleigh Park. There are also several isolated rural residential listed buildings (Grade II) present within the wider area.

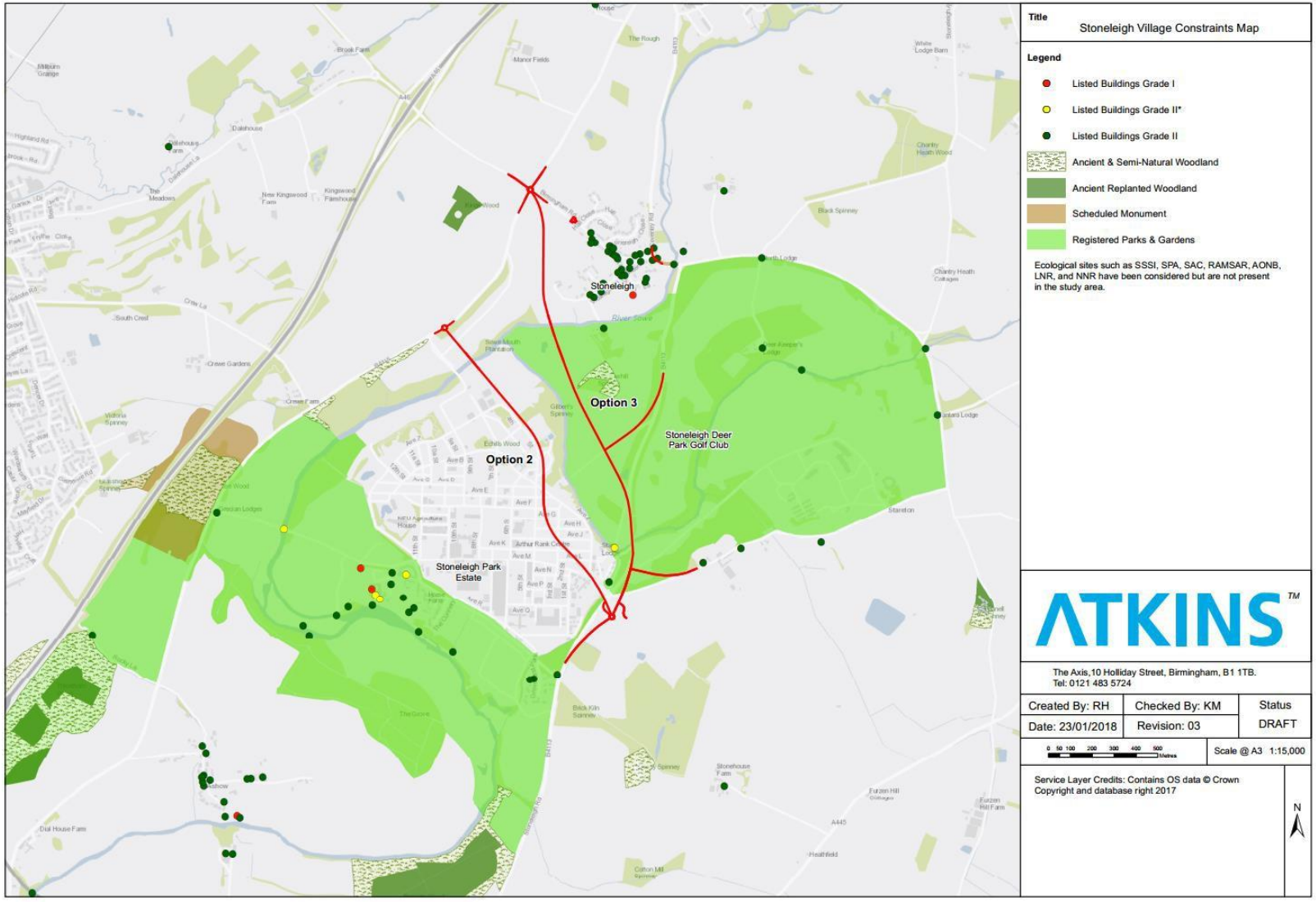
The registered park and garden situated to the east of Stoneleigh Park comprises Stoneleigh Deer Park Golf Club, Abbey Park, and the River Avon. This registered area is bounded by Coventry road to the north-east, a minor road to the east and south, the River Avon to the west, and the River Sowe to the north-west. Within this boundary, eight listed buildings (one Grade II* and six Grad II) have been recorded and immediately adjacent to the southern boundary outside of the registered area are three Grade II listed properties including 1 & 2 Streaton Village, 4 & 5 Streaton Village, and Yew Tree Cottage. The registered park and garden situated to the west of Stoneleigh Park comprises 22 listed buildings including Stoneleigh Abbey and Stoneleigh Abbey Gatehouse (both Grade I).

6.2.2. Bypass Options

The proposed route options will potentially directly impact specific environmental constraints outlined above. Within approximately 2km of the proposed route options, most environmental constraints outlined above are included, with Ashow village being just outside for Option 3. Option 3 is within 200m of the west boundary of Stoneleigh village and as noted above the village comprises a high density of listed buildings. Within 200m of the route options there are several Grade II listed buildings to the south and also Stare Bridge, a Grade II* red sandstone Medieval road bridge. Optional road closures are proposed within Stoneleigh village and the section proposed along Coventry Road is adjacent to four Grade II listed buildings.

Option 2, which routes through Stoneleigh Park, crosses the River Sowe to the north, routes along the west boundary of the South Mouth Plantation (woodland / forest), and intersects a small area of grassland also to the north. Option 3 routes through the registered park and garden to the east of Stoneleigh Park Estate, intersecting the River Sowe to the north and the River Avon to the south.

Figure 8. Environmental Constraints Map



6.3. Impacts on Traffic

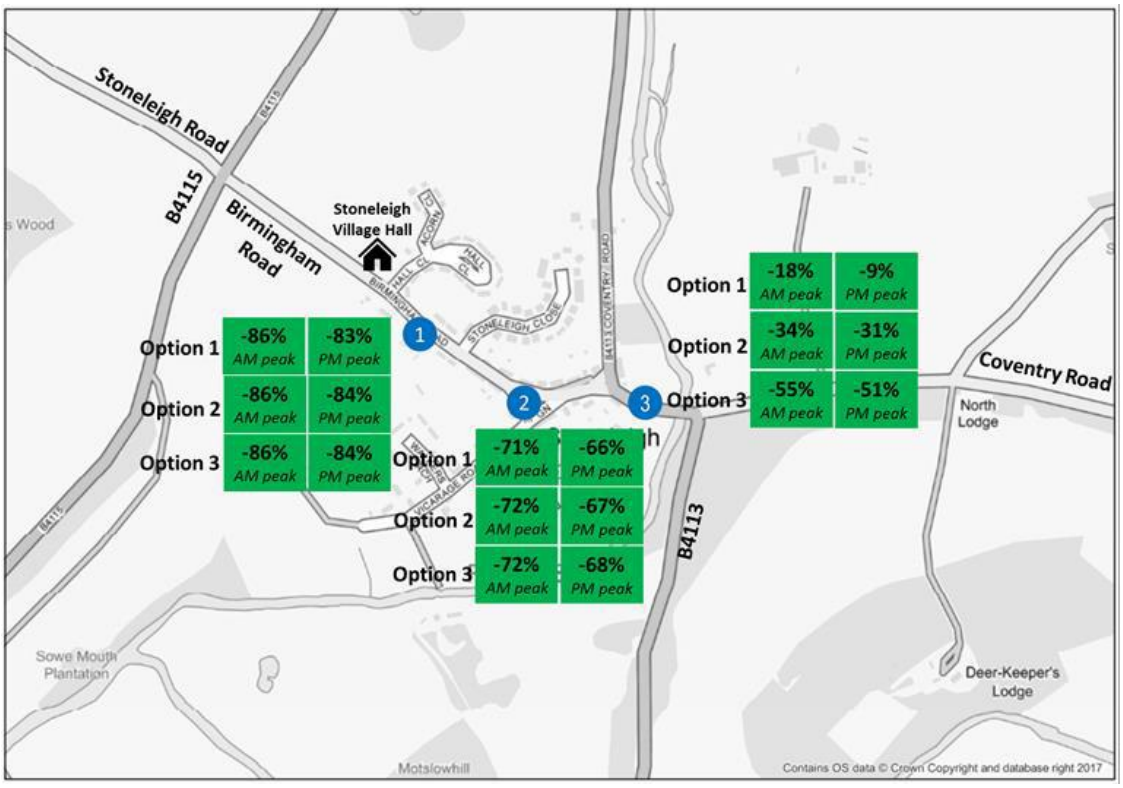
Following the environmental assessment, the short-list of options was modelled in the KSWA model. These tests are termed 'do-something tests' as they capture the impact of the options being introduced.

Link flow information has been extracted for the same three locations in Stoneleigh village as per the analysis earlier in the report and is presented in Figure 9. Figure 9 makes a comparison of the 2029 Local Plan scenario and the 2029 Do-Something tests for Options 1, 2 and 3. A negative percentage indicates a reduction in traffic relative to the 2029 Local Plan scenario and hence indicate that relief is provided to the village in terms of traffic flows.

The figure shows that the number of vehicles passing through Link 1 and 2 is expected to significantly decrease in all of the do-something scenarios, which is to be expected given that Birmingham Road is assumed to be closed. Residual traffic flows (and the reason for flows not reducing by 100%) are those accessing the village. In addition, flows on the Coventry Road narrow bridge over the River Sowe (Link 3) are shown to reduce by between 9% and 55%, reflecting significant re-distribution of traffic flows in the area.

Figure 9 confirms that all three options are expected to significantly reduce traffic flows in the village relative to the 2029 Local Plan scenario.

Figure 9. Link Flow Comparison: 2029 Do Nothing to 2029 Do Something



7. Costs

7.1. Introduction

High-level costs for the short-list of options have been estimated. This is in order to inform the cost-benefit assessment that will be undertaken following the outcomes of this study. It is important that WCC has clear visibility of costs in order to determine the relative feasibility of introducing different changes in the area.

7.2. Costs

Costs for the short-list of options have been calculated and are provided in Table 7. Note these are the total costs which includes elements that HS2 Ltd are expected to fund, including, for example, bridges over the new railway line.

Table 7. Costing Summary

Option Number	Key Components	Capital Cost	Supporting Commentary
1	Closure of Birmingham Road at junction with B4115 + conversion of B4115 / B4113 Junction to signalised junction	£130k, covering: • Turning Head + Access + Concrete Blocks (to stop-up Birmingham Road) • Signalisation of B4113 / B4115 junction	-
2	New bypass through Stoneleigh Park, with a new roundabout at the junction of the bypass / B4115 and a new roundabout to replace the B4115 / Birmingham Road junction. In addition, Birmingham Road is blocked on the west side of the village (as per Option 2A in the drawing)	£41m, covering: • 1.9km of Single Carriageway* • Bypass Bridge over River Avon* • Bypass Bridge over HS2* • B4113 Bridge over HS2* • Roundabout Junction 1 - B4113 / New Bypass* • Roundabout Junction 2 - New Bypass / B4115 • Roundabout Junction 3 - B4115 / Birmingham Road • Turning Head + Access + Concrete Blocks (to stop-up Birmingham Road)	Note that this option assumes that while the Birmingham Road is blocked, no change is made to the B4113 / B4115 junction
3	New bypass between Stoneleigh Park and the village of Stoneleigh. The works include building the bypass and a new roundabout to replace the B4115 / Birmingham Road junction	£31m, covering: • 3.3km of Single Carriageway • HS2 accommodating works - 0.9km of Single Carriageway* • Bypass Bridge over River Sowe • B4113 Bridge over HS2*	Note that this option assumes that while the Birmingham Road is blocked, no change is made to the B4113 / B4115 junction

Option Number	Key Components	Capital Cost	Supporting Commentary
		• Roundabout Junction 1 - B4113 Entrance to Stoneleigh Park* • Roundabout Junction 2 - New Bypass / B4115 / Stoneleigh Road • Turning Head + Access + Concrete Blocks (to stop-up Birmingham Road)	

*Elements that are likely to be supplied and paid for by HS2 Ltd. However, the elements that are provided by HS2 Ltd may not be exactly what is required for the bypass options therefore discussions with HS2 Ltd are ongoing in regards to specific infrastructure that will be delivered.

7.3. Funding

Table 7 shows that capital costs in excess of £30m are forecast for both Options 2 and 3, in part due to the large capital works with routing these options over the new railway.

There is potential for a number of elements of Option 2 to be funded by HS2 Ltd as part of their works in Stoneleigh Park. The elements that are most likely to be funded by HS2 Ltd are the bypass road itself, the bypass bridge over the River Avon, the bypass bridge over HS2, the B4113 bridge over HS2 and the new roundabout connecting the B4113 and the new bypass. If HS2 Ltd was to fund all or at least most of these elements, it would significantly reduce the cost of delivering the scheme for the Local Authority. Discussions with HS2 Ltd regarding specific plans for Stoneleigh Park are ongoing.

There is potential for a small number of elements of Option 3 to be funded by HS2 Ltd as part of its works in the area. The elements that are most likely to be funded by HS2 Ltd are part of the bypass road, the B4113 bridge over HS2 and the roundabout at the B4113 / Stoneleigh Park entrance junction. As above for Option 2, discussions with HS2 Ltd regarding specific plans for Stoneleigh Park are ongoing. The majority of the cost for Option 3 would need to be secured through a competitive business case process through WCC which is dependent on the strength of the business case and the availability of funding. It is therefore likely that Option 3 could be considerably more expensive than Option 2 for WCC.

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8. Recommendations

8.1. Introduction

Using the findings outlined previously in this report, this chapter provides recommendations regarding further development of each of the options.

8.2. Recommendations

A summary of the three short-listed options is provided in Table 8, including Atkins' recommendations for further technical work. Although the options have been assessed against their fit with the study objectives, it is imperative that they are considered in terms of their strategic fit with local transport plans during future stages of work.

Table 8. Recommendations

Option	Cost (£)	Fit with Study Objectives	Recommendations
1. A closure to Birmingham Road, east of the junction with the B4115	£130k	• This option would reduce traffic on Birmingham Road, Coventry Road, and reduce pressure on the bridge over the River Sowe. • It would reduce the environmental impacts of congestion in Stoneleigh village and is deliverable within short timescales.	The option is shown to significantly reduce traffic in the village through blocking the route for through-traffic. Further work is required to: • Determine the optimum location / layout arrangement associated with blocking this route. This assessment must consider how the route would be signed to ensure that road users are aware of the alternative routes that are available to them. • Determine the phasing of this option. It does not rely upon any HS2 Ltd works in the area and hence could be considered for implementation as a 'quick win' in the near future. • Consult with the Parish Council, other key stakeholders and the public. • Further develop the business case, taking account of the modelled benefits and estimated scheme costs.
2. A western bypass through Stoneleigh Park to the B4115	£41m	• This option would reduce traffic on Birmingham Road, Coventry Road, and reduce pressure on the bridge over the River Sowe. • It would reduce the environmental impacts of congestion in Stoneleigh village. • It would improve access to Stoneleigh Park by providing a direct route. • It would make best use of the HS2 infrastructure being	The option uses infrastructure proposed by HS2 Ltd to create a new bypass, offering the opportunity to reduce flows of traffic through the village of Stoneleigh. This could be introduced in conjunction with the closure outlined in Option 1. Further work is required to: • Confirm HS2 Ltd's intentions regarding infrastructure in the Stoneleigh Park area, noting that construction work is forecast to begin in the area in 2019. Liaison is needed to ensure that the highway route being provided by HS2 Ltd through Stoneleigh Park is of a suitable standard that could be adopted by the local authority. It is also essential that the form of junctions and structures on the route is agreed at the earliest opportunity.

Option	Cost (£)	Fit with Study Objectives	Recommendations
		provided in the area, thereby reducing costs. • It could be delivered by 2026 at the latest.	• Confirm the level of value for money, taking account of the modelled benefits and estimated scheme costs.
3. A western bypass using an alignment between Stoneleigh Park and Stoneleigh Village	£31m	• It would reduce traffic on Birmingham Road, Coventry Road, and reduce pressure on the bridge over the River Sowe. • It would reduce the environmental impacts of congestion in Stoneleigh village. • It would improve access to Stoneleigh Park by providing a direct route. • It could be delivered by 2026 at the latest.	As per Option 2, this option also offers the opportunity to significantly reduce traffic flows in the village of Stoneleigh, but it does not use HS2 Ltd infrastructure to the same extent as that proposed in Option 2. Further work is required to understand the level of value for money taking account of the modelled benefits and estimated scheme costs. This will allow for a direct comparison to be made between the two options.

8.3. Conclusion

This study has considered options for reducing traffic congestion in the village of Stoneleigh in Warwickshire. This was in the context of significant changes planned for the area which are expected to lead to increasing traffic flows and congestion, as demonstrated by the traffic modelling results outlined earlier in the report.

The study has recommended three options to undergo further technical work to ultimately identify a preferred option for reducing traffic in Stoneleigh village. During the next stage of technical work, consideration will also need to be given to wider network resilience to understand the broader benefits / impacts of the options.

It should be noted this study is only the first stage in a wider study looking at this area of Warwickshire. The results of this study will be considered alongside future studies and other developments that are being considered in the Stoneleigh area.

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